

**2001 SUMMARY REPORT
of
PETERSON POND**

Lake County, Illinois

Prepared by the

**LAKE COUNTY HEALTH DEPARTMENT
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EXECUTIVE SUMMARY

Peterson Pond is a 9.1-acre lake with a maximum depth of 13 feet located just north of Libertyville along Illinois Route 21. The lake was formed about 1903, originally as a gravel pit, and is now owned by the Lake County Forest Preserve District. No boating (i.e., canoes, etc.) is permitted and only bank fishing is allowed on this lake. No development exists around the lake, except for a small footpath that connects this area with the Independence Grove Forest Preserve. Peterson Pond is in good condition because of the lack of development around its shores.

The water clarity in the lake is good, with an average Secchi disk reading of 6.47 feet during 2001. The lake has low concentrations of total suspended solids, which is a parameter directly linked to good water clarity.

Phosphorus and nitrogen, key ingredients for algae and plant growth were low in Peterson Pond. Total phosphorus near the surface was 47% lower than the Lake County median, and ammonia and nitrate nitrogen forms were not detected in any sample throughout the season. Total Kjeldahl nitrogen averages in the Pond were also lower than Lake County medians.

Good concentrations of dissolved oxygen were found in Peterson Pond. The water column had dissolved oxygen concentrations of at least 5 mg/L from the surface down to the bottom in June, and down to approximately 9 feet during the remainder of the 2001 sampling season.

Staff identified six aquatic plant species and one macroalgae (*Chara*). Over the season, the two most commonly found aquatic plant were Eurasian water milfoil (EWM) and sago pondweed. The invasive exotic, EWM, could pose a problem within Peterson Pond in the future. However, an important discovery during 2001 was the presence of the water milfoil weevil [*Euhrychiopsis lecontei* (*E. lecontei*)], which is a biological control organism used to control EWM. *E. lecontei* is a native weevil, which feeds almost exclusively on milfoil species.

The entire shoreline of Peterson Pond is classified as undeveloped, and hosts a variety of wildlife habitat types such as prairie, wetland, shrub, buffer and beach. Slight erosion was noted along prairie and shrub shorelines. None of the shoreline was moderately or severely eroding. However, the slightly eroding shoreline encompasses 43% of the entire shoreline length. Over time, these slightly eroding areas may erode further if they are not protected from wave action.

Staff also noted the presence of invasive, aggressive plant species, along the majority of the shoreline, and in some areas was very dense. Common reed (*Phragmites australis*), teasel (*Dipsacus sylvestris*), and reed canary grass (*Phalaris arundinacea*) were identified most often. These aggressive plants can crowd out native, beneficial plants. The removal of these species is recommended.

Good numbers of wildlife, particularly birds, were noted on and around Peterson Pond. An osprey and a pied-billed grebe were observed on Peterson Pond, but were assumed to be migrating through and simply using the Pond as a stopover site. The grebe, a state of Illinois threatened species, was seen in April and the osprey, a state of Illinois endangered species, was seen in September.

LAKE IDENTIFICATION AND LOCATION

Lake Name: Peterson Pond

County: Lake

Nearest Municipality: Libertyville

Location: T46N, R11E, Section 19, SW ¼

Watershed: Des Plaines River

Sub-Basin: Upper Des Plaines

Major Tributaries: None

Receiving Body of Water: Bull Creek

Surface Area: 9.1 acres

Shoreline Length: 0.4 miles

Maximum Depth: 13 feet

Mean Depth: 6.5 feet (estimated)

Volume: 59 acre-feet (estimated)

Lake Type: Gravel Pit, constructed approximately in 1903.

LIMNOLOGICAL DATA - WATER QUALITY

Water samples were collected once a month, from June through September 2001, at the deepest location (See Figure 1). See Appendix B for water quality sampling and laboratory methods. In general, Peterson Pond had good water quality and low levels of nutrients, due in part to the lake's origin (gravel pit) and that it is relatively isolated (i.e., no development or stormwater entering the lake). Most of the water quality parameters measured were similar to or below the averages of other Lake County lakes that the Health Department has monitored. Several important findings were noted.

The water clarity in Peterson Pond averaged 6.47 feet deep in 2001, better than the Lake County median of 4.18 feet deep. Some algae and sediment were present in the water column, but not in excess. Total suspended solids averaged 3.8 mg/L near the surface, which was lower than the Lake County median of 5.7 mg/L.

Total phosphorus (TP) concentrations in Peterson Pond were lower than Lake County median for near surface samples. During 2001, the near-surface average seasonal TP concentration of 0.025 mg/L was less than the county median of 0.047 mg/L.

The trophic condition of a lake indicates the overall level of nutrient enrichment. Most lakes in Lake County are eutrophic or nutrient rich, and are productive lakes in terms of aquatic plants and/or algae and fish. A mesotrophic lake has an intermediate amount of nutrients and lower biological productivity than a lake with eutrophic status. Most lakes in Lake County are eutrophic or nutrient rich. Higher TP concentrations are linked to more algae in the water and hence, lower water clarity. The condition of Peterson Pond in terms of its phosphorus concentrations during 2001 was eutrophic, but bordering mesotrophic. Peterson Pond ranked #20 out of 103 Lake County lakes based on average total phosphorus concentrations (See Table 2 in Appendix A)¹.

Nitrogen parameters measured (total Kjeldahl nitrogen, ammonia nitrogen, and nitrate nitrogen) were all in low concentrations in Peterson Pond. Both ammonia nitrogen and nitrate nitrogen were non-detectable in both the near surface and deep-water samples throughout the season.

The ratio of total nitrogen to total phosphorus (TN:TP) indicates if the amount of phosphorus or nitrogen would limit algae and/or plant growth in the lake. Lakes with TN:TP ratios of more than 15:1 are usually limited by phosphorus. Those with ratios less than 10:1 are usually limited by nitrogen. In Peterson Pond, the TN:TP ratio is 28:1, indicating a lake limited by phosphorus. Most lakes throughout Lake County are phosphorus limited.

In 2001, Peterson Pond exhibited polymictic tendencies, meaning it stratified and turned over several times during the year. In May the lake was weakly stratified at the 6-foot depth. By June, the lake had turned over and in July had stratified at the 9-foot depth. In

¹ Data set from 1995 to 2002.

Figure 1

August, the thermocline was present near the bottom at 11 feet, but by the September visit, it had completely mixed. Dissolved oxygen (DO) concentrations of at least 5 mg/L were found from the surface down to the bottom in May, June and September. In July and August, a small anoxic zone (<1mg/L) below 11 feet was present.

Water levels in Peterson Pond were noted during each sampling period. The water levels rose 3.4 inches from May to June, and dropped 11.4 inches from June to July. Small increases of 3.4 inches and 1.2 inches were noted between the July/August samples dates and the August/September sample dates. However, shortly before the September sample date, a beaver apparently plugged the outlet pipe to Bull Creek. This, in conjunction with recent rains, caused water to overtop Peterson Pond and flood some of the nearby walking paths. The Forest Preserve staff then had to use a pump² in order to drain the excess water into Bull Creek in order to find and unplug the outflow pipe.

The Illinois Environmental Protection Agency has assessment indices to classify Illinois lakes for their ability to support aquatic life, swimming, or recreational uses. The guidelines consider several aspects, such as water clarity, phosphorus concentrations and aquatic plant coverage. Peterson Pond fully supports aquatic life and swimming, but was classified as only a partial support for recreation, primarily due to the aquatic plant growth in the lake. The overall use support category for Peterson Pond is that of full support.

LIMNOLOGICAL DATA – AQUATIC PLANT ASSESSMENT

Staff randomly sampled locations in Peterson Pond each month for aquatic plants, and identified six species (Table 3) and one macroalgae (*Chara*). Table 4 in Appendix A lists the plant species with the frequency that they were found. Over the season, the two most commonly found aquatic plant were Eurasian water milfoil (EWM) and sago pondweed, which were found in 77% and 44% of the plant sampling sites, respectively. The invasive exotic, EWM, could pose a problem within Peterson Pond in the future. However, an important discovery during 2001 was the presence of the water milfoil weevil [*Euhrychiopsis lecontei* (*E. lecontei*)], which is a biological control organism used to control EWM. *E. lecontei* is a native weevil, which feeds almost exclusively on milfoil species. It was originally discovered while investigating declines of EWM in a Vermont lake in the early 1990s. It was discovered in northeastern Illinois lakes in 1995. Currently, the LCHD-Lakes Management Unit has documented *E. lecontei* in 23 Lake County lakes. Many of these lakes have seen declines in EWM populations in recent years. In Peterson Pond, LCHD staff noted weevil damage on Eurasian water milfoil plants in the north section of the lake.

² A 1,300 gpm Wacker pump was used with a 10" outflow pipe.

Table 3. Aquatic and shoreline plants on Peterson Pond, May – September, 2001.

Aquatic Plants

Chara	<i>Chara</i>
Eurasian water milfoil	<i>Myriophyllum spicatum</i>
Slender naiad	<i>Najas flexilis</i>
White Water Lily	<i>Nymphaea tuberosa</i>
Largeleaf Pondweed	<i>Potamogeton amplifolius</i>
Curlyleaf Pondweed	<i>Potamogeton crispus</i>
Sago Pondweed	<i>Stuckenia pectinatus</i>

Shoreline Plants

Swamp milkweed	<i>Asclepias incarnata</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>
Common Reed	<i>Phragmites australis</i>
Common cattail	<i>Typha latifolia</i>

Aquatic plants will not photosynthesize in water depths with less than 1% of the available sunlight. Water clarity and depth are the major limiting factors in determining the maximum depth at which aquatic plants will grow in a specific lake. In the case of Peterson Pond, the 1% light level reached the bottom during May, July and August of 2001. The 1% light level was at 9 feet deep in June and approximately 7 feet deep in September. In 2001, the maximum depth that plants were found over the season was 10 feet. Because the 1% light level is available down to the bottom for much of the growing season, plants could potentially cover 100% of the lake bottom. This is not the case at this time, as we could only find plants growing to a maximum depth of 10 feet.

Floristic quality index is a measurement designed to evaluate the closeness of the flora (plants species) of an area to that with undisturbed conditions. It can be used to: 1) identify natural areas, 2) compare the quality of different sites or different locations within a single site, 3) monitor long term floristic trends, and 4) monitor habitat restoration efforts. Each floating and submersed aquatic plant in a lake is assigned a number between 1 and 10 (10 indicating the plant species most sensitive to disturbance). These numbers are then used to calculate the floristic quality index (FQI). A high FQI number indicates that there are a large number of sensitive, high quality plant species present in the lake, and better plant diversity. Nonnative species are included in the FQI calculations for Lake County lakes. The FQI of 64 lakes measured in 2000 and 2001 ranges from 0 to 37.2, with an average of 14. Peterson Pond has a FQI of 11.4, indicative of less than average aquatic plant diversity.

LIMNOLOGICAL DATA – SHORELINE ASSESSMENT

In July, 2001, LCHD staff assessed the shoreline of Peterson Pond. See Appendix B for a discussion of the methods used. The entire shoreline is classified as undeveloped. The types of shoreline that were recorded (see Figure 2) were prairie (58% of the total shoreline), wetland (24%), shrub (12%), buffer (3%) and beach (3%). Shoreline erosion was noted in 2001. Figure 3 shows slight erosion along prairie and shrub shorelines. None of the shoreline was moderately or severely eroding. However, the slightly eroding shoreline encompasses 43% or 1,083 feet of the entire shoreline length. Over time, these slightly eroding areas may erode further if they are not protected from wave action.

Staff also noted the presence of invasive, aggressive plant species, along the majority of the shoreline, and in some areas was very dense. Common reed (*Phragmites australis*), teasel (*Dipsacus sylvestris*), and reed canary grass (*Phalaris arundinacea*) were identified most often. These aggressive plants can crowd out native, beneficial plants. The removal of these species is recommended.

Figure 2

figure 3

LIMNOLOGICAL DATA – WILDLIFE ASSESSMENT

Good numbers of wildlife, particularly birds, were noted on and around Peterson Pond. See Appendix B for methods. Several of the species listed in Table 5 were seen during spring or fall migration and were assumed not to be nesting around the lake. This is assumed to be the case with the osprey and the pied-billed grebe that were observed on Peterson Pond. The grebe, a state of Illinois threatened species, was seen in April and the osprey, a state of Illinois endangered species, was seen in September.

Good habitat exists around Peterson Pond. Woods around the lake's perimeter and shrub/prairie habitat offer a good mix of vegetation types. Minimal disturbance is also beneficial.

No fish surveys were completed by LCHD in 2001, although many small bluegill were noted throughout the season.

Table 5. Wildlife species observed on Peterson Pond, May – September, 2001.

Birds

Pied-billed Grebe+	<i>Podilymbus podiceps</i>
Red-breasted Merganser	<i>Mergus serrator</i>
American Coot	<i>Fulica americana</i>
Great Blue Heron	<i>Ardea herodias</i>
Sora Rail	<i>Porzana carolina</i>
Killdeer	<i>Charadrius vociferus</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Osprey*	<i>Pandion haliaetus</i>
Turkey Vulture	<i>Cathartes aura</i>
Mourning Dove	<i>Zenaida macroura</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Common Flicker	<i>Colaptes auratus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Eastern Phoebe	<i>Sayornis phoebe</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
American Crow	<i>Corvus brachyrhynchos</i>
Blue Jay	<i>Cyanocitta cristata</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>
House Wren	<i>Troglodytes aedon</i>

**Table 5. Wildlife species observed on Peterson Pond, May – September, 2001
(cont'd).**

Ruby-crowned Kinglet	<i>Regulus calendula</i>
American Robin	<i>Turdus migratorius</i>
Wood Thrush	<i>Hylocichla mustelina</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Warbling Vireo	<i>Vireo gilvus</i>
Yellow Warbler	<i>Dendroica petechia</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Northern Oriole	<i>Icterus galbula</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
American Goldfinch	<i>Carduelis tristis</i>
Song Sparrow	<i>Melospiza melodia</i>

Mammals and Reptiles

None noted.

Amphibians

American Toad	<i>Bufo americanus</i>
Bull Frog	<i>Rana catesbeiana</i>

Insects

Cicadas
Dragonfly
Damselfly
Red Admiral Butterfly
Black Swallowtail Butterfly

* **Endangered in Illinois**

+**Threatened in Illinois**

EXISTING LAKE QUALITY PROBLEMS AND MANAGEMENT SUGGESTIONS

Peterson Pond had good water quality, with low concentrations of most of the parameters measured. It also provides good habitat for wildlife as well as an aesthetic setting for Forest Preserve visitors.

- *Lack of a Quality Bathymetric Map*

A bathymetric (depth contour) map is an essential tool in effective lake management since it provides information on the morphometric features of the lake, such as depth, surface area, volume, etc. The knowledge of this morphometric information would be necessary if lake management practices such as aquatic herbicide use, fish stocking, dredging, an alum treatment or aeration were part of an overall lake management plan. Peterson Pond does not have a recent bathymetric map. Maps can be created by the Lake County Health Department – Lakes Management Unit or other agencies for costs that vary from \$3,000-\$10,000, depending on lake size.

- *Invasive Shoreline Plant Species*

LCHD staff noted the presence of aggressive exotic plant species along the western and northeastern shorelines. Common Reed (*Phragmites australis*), teasel (*Dipsacus sylvestris*), and reed canary grass (*Phalaris arundinacea*) were identified most often.

- *Eurasian Water Milfoil*

The invasive exotic, Eurasian water milfoil, was found to be the most common aquatic plant in Peterson Pond. The control or elimination of this plant is encouraged. The milfoil weevil (*Euhrychiopsis lecontei*) was found in the lake and some damage on milfoil plants was noted.